

Bunker Hill Company Process Plants
Silver King Community
Kellogg
Shoshone County
Idaho

HAER No. ID-~~3~~ 39

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WRITTEN HISTORICAL AND DESCRIPTIVE DATA

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HISTORIC AMERICAN ENGINEERING RECORD

BUNKER HILL COMPANY PROCESS PLANTS

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The 1883 discovery of placer gold on Prichard Creek, a tributary of the Coeur d'Alene River in Northern Idaho, sparked a gold rush as frenzied as any of the Western mineral discoveries of the nineteenth century. Within a very short space of time, the town of Murray, Idaho soon supplanted Eagle City (site of the initial locations by A. J. Pritchard) as the center of the mining boom. By 1884, Murray was home to more than 10,000 hopeful prospectors and the citizens who provided support services to the miners. As the supply of easily extracted gold was exhausted, prospectors sought mineral wealth further afield, spilling over into the neighboring valley of the South Fork of the Coeur d'Alene River. In 1885, a prospector named Noah Kellogg located one of the largest and most productive galena (a lead sulfide ore) lodes in the world- the Bunker Hill and Sullivan claims, thereby giving rise to the boomtown of Wardner, Idaho. On the heels of this discovery, prospectors found rich lead/zinc orebodies in what became known as Burke Canyon, at the eastern edge of the district, next to the Montana state line. Kellogg's claims, and the Burke Canyon discoveries, gave birth to the storied Coeur d'Alene Mining District.

The Coeur d'Alenes was actually a group of mining districts: at its western edge, near the juncture of the South Fork of the Coeur d'Alene River with its main stem (and centered on the city of Kellogg) lay the Yreka District; further to the east, near the town of Osburn, the Evolution District was organized; Wallace, the county seat of Shoshone county (within which all of the districts fell) was in the Placer Center District; Burke Canyon was organized as the Leland District; and, at the eastern terminus of Mullan, the Hunter District was laid out. The intense mining activity in these districts resulted in a great number of working properties, all of which eventually became holdings of the major district mining companies that succeeded the individual prospectors and mining promoters. Principal among these were the Bunker Hill & Sullivan Mining & Concentrating Company, Federal Mining & Smelting Company, Hecla Mining Company, Day Mines Company, Sunshine Mining Company, and American Smelting and Refining Company (ASARCO).

Noah Kellogg's discovery, and those of the horde of claimants who followed in his wake, involved a good deal of legal wrangling and change of ownership. The 1887 purchase of the claims and mill at Wardner (in Milo Gulch) by Simeon G. Reed, a Portland, Oregon financier, firmly established the fledgling Bunker Hill & Sullivan Mining & Concentrating Company as one of the better capitalized operations in the Coeur d'Alenes. The Company also benefitted from the active interest and participation of gifted mining professionals like Albert Burch, Frederick Bradley, and Stanly Easton. Bradley and Easton, two young men at the beginning of their long mining careers, were to be of especial importance in the affairs of the Bunker Hill & Sullivan.

The mine that they were associated with started out as a typical high grade venture, with hand-sorting of the richest ore from gangue material for shipment to processors outside of the district. This first "rock house" type of mill at Wardner was improved and equipped with milling machinery (crushers, jigs, classifiers, and trommels) for separation of lower grade mineral from its waste, or tailings. The resultant lead concentrate was shipped from the railroad station at Milo Junction (later Kellogg) and sold to smelting and refining plants located outside of the Coeur d'Alene Mining District. The limited available land in Wardner led Bunker Hill to establish the South Mill on a bench of land above the South Fork of the Coeur d'Alene River. With the 1902 completion of the Kellogg Tunnel from the South Mill to the underground workings, operations were finally centered in the new community of Kellogg (successor to Milo Junction). As technology improved, the South Mill, and succeeding mills, utilized vanners and Wilfley tables to extract more metal values from the ore. The development of flotation milling in the twenties and thirties further improved beneficiation of mined ores.

The costs of rail shipment and smelter charges limited the profitability of the Bunker Hill Mine. Frederick Bradley's purchase of a smelter in Tacoma, Washington in 1898 gave Bunker Hill access to preferential smelting treatment, but it wasn't until 1917, with the building of the Bunker Hill Lead Smelter at Bradley, Idaho (one mile west of the Bunker Hill Mine), that the Bunker Hill & Sullivan Mining & Concentrating Company began to distinguish itself from other Coeur d'Alene District mining companies as more than a producer of concentrated ores. With the operation of the Lead Smelter, Bunker Hill was on its way to becoming an integrated production facility, with component elements. The Lead Smelter processed ore receipts from its own Bunker Hill Mine (and other local operators) to produce refined lead, gold, and silver. In the course of its history, it would also be a significant contributor of finished product antimony and cadmium to the metals market, along with byproduct sulfuric acid (H_2SO_4) and byproduct copper residue for other smelters.

In 1921, Bunker Hill engaged in pilot plant research, at its North Mill, to test the applicability of the Tainton-Pring high current density/strong acid electrolytic process on low grade zinc concentrates from the Star Mine in Burke Canyon. The successful electrowinning of zinc achieved by this experiment resulted in the building of the Sullivan Electrolytic Zinc Plant in Government Gulch (south of the Lead Smelter). The Star Mine and the Zinc Plant were both entities of the Sullivan Mining Company, a new company involving participation by both the Bunker Hill & Sullivan Mining & Concentrating Company and the Hecla Mining Company (owners of the Hecla Mine in Burke Canyon). Electricity from the Washington Water Power Company (generated at their hydroelectric facilities on the Spokane River), plant process and cooling water from ground water wells in the South Fork of the Coeur d'Alene

River drainage, and zinc concentrates from the Star Mine were utilized in the production of 99.99+% Special High Grade zinc at the Sullivan Plant. This high purity product set the standard for the zinc industry, and it was in great demand by the burgeoning zinc die cast industry. A year after operations began, another facility was constructed at the Zinc Plant for the production of pure cadmium. Residues from plant operations were also sold to the Lead Smelter (and other refineries) for extraction of lead, silver, gold, copper, cobalt, and mercury. Eventually, the Zinc Plant would expand into production of specialty products including die cast alloys, galvanic protection anodes, and Prime Western zinc.

In 1954, the Sullivan Mining Company erected a Monsanto Acid Plant at the Zinc Plant and began production of sulfuric acid (H_2SO_4) from byproduct sulfur dioxide gas. This initial Acid Plant was followed by a second facility (located adjacent to the first) in 1967, and by an Acid Plant at the Lead Smelter in 1970. H_2SO_4 was basic to chemical operations throughout the world, and the post-World War II need for its use in fertilizer production heightened market demand.

Bunker Hill broadened utilization of H_2SO_4 production in 1960 with the construction of a Phosphoric Acid Plant near the mouth of Government Gulch. Phosphate rock and H_2SO_4 were utilized in producing Orthophosphoric (52%) and pyrophosphoric (70%) acids for the agricultural market. An adjacent facility, built in 1965, produced ammonium phosphate fertilizers. This expanded Phosphoric Acid/Fertilizer Plant was operated as the North Idaho Phosphate Company, a joint venture between The Bunker Hill Company and Stauffer Chemical Company. For several years, a liquid suspension fertilizer was also manufactured at the NIPCO plant.

These three plants all grew out of the operations of the Bunker Hill Mine. They were the physical manifestations of the growth of a company that evolved from one mining operation (among many district competitors) into a corporation involved in the manufacture of a great variety of finished products. The Company underwent changes in its corporate structure in 1955, the same year that it purchased Hecla's shares in the Sullivan Mining Company. It had shed the old name of Bunker Hill & Sullivan Mining & Concentrating Company, absorbed and dissolved the Sullivan Mining Company, and gained a unified identity- The Bunker Hill Company. Within thirteen years, this new entity would become part of another company's holdings, as Gulf Resources & Chemical Corporation staged a successful takeover of Bunker Hill in 1968.

The products of Bunker Hill's plants served a wide-ranging market. Beginning in 1918, Lead from the Bunker Hill Smelter was used in the production of leaded gasolines, paints, automobile batteries, and antimonial (or hard) lead to name just a few applications. Since 1928, Bunker Hill Brand Special High Grade zinc was the highest quality zinc available for the varied products manufactured by the die casting industry. Starting in 1958, Bunker Hill die casting zinc alloys and cathodic protection anodes were

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also products in demand by industry. Die casting zinc alloys were used in the production of automobile parts (such as carburetors, hood ornaments, and door handles), control valves, hardware, plumbing fixtures, and a great variety of other items. Wherever there was a need for sulfuric acid, Bunker Hill was capable of supplying that market, too. This included the production of food grade sulfuric acid after 1972. The output of the North Idaho Phosphate Company plant found use in the Western agricultural industry, both as phosphoric acids and as finished ammonium phosphate fertilizers. History had witnessed the growth of Bunker Hill from raw ore supplier to a marketer of diverse and specialized products.

In the related narratives HAER No. ID-28 and HAER No. ID-30, the Bunker Hill Lead Smelter and the North Idaho Phosphate Company are historically documented. A number of people central to their development have been mentioned, but literally thousands of Bunker Hill and Sullivan employees were involved in the successful operation of the Bunker Hill Mine and Concentrator (for nearly one hundred years), the Bunker Hill Lead Smelter (sixty-four years), the Sullivan Electrolytic Zinc Plant (fifty-three years), and the North Idaho Phosphate Company (nearly twenty-one years). To those employees who spent part or all of their working lives contributing to the success of the enterprise credit is due. They were essential to the integrated functioning of the various units of The Bunker Hill Company. The finished metals, acids, and fertilizers that they produced established the high quality of Bunker Hill Brand products. In turn, their identification with the workplace was an integral part of the life of the city of Kellogg, Idaho and its surrounding environs. It is a heritage that Coeur d'Alene District inhabitants still take pride in, even as the nature of the area changes, and fashion accords it a new name--the Silver Valley.